GUJARATTECHNOLOGICALUNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Plastic Engineering

Subject Code: ME02084101

Course/Subject Name: Plastic Packaging Technology

w.e.f. Academic Year:	2024-25
Semester:	2
Category of the Course:	Plastic Packaging Technology

Prerequisite:	Plastic Processing
Rationale:	Nil

Course Outcome:

After Completion of the Course Student will able to:

No	Course Outcomes
01	Student will be able to design plastic packages as per requirement
02	Student will be able to identify and choose correct packaging materials for specific applications
03	Student will be able to create new innovative packages
04	Student will be able to suggest suitable processing techniques for packages

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial/ Practical		
L	T	PR	C	ESE (E)	PA/ CA (M)	PA/CA(I)	ESE (V)	
3	0	2	4	70	30	20	30	150

Course Content:

Unit No.	Content	No.of Hours	%of Weightage
1.	• Introduction : What is Packaging, Types and categories of Packaging, who needs packaging, hazards in distribution, shelf life studies , Functions of Packaging • Package Design Fundamentals • Need for changes in Package Design, • Features of effective Design: Design factors, Customer Appeal-Packaging Graphics • Package Colour	10	15

2.	**Plastics in Packaging:** **WHY USE OF PLASTICS IN PACKAGING?** • Material Selection criteria -Advantages and limitations of plastic packaging - Plastics used for packaging applications[industry wise] FILMS: LDPE, HDPE, HMHDPE, LAMINATED FILMS, BOPET/BOPP FILMS, ABS, RETORT FILMS, etc. Bottles[caps and closures] : HDPE, PET, PP ,SAN, etc. Tetrapack films, Air bubble films, shrink films , stretch films for domestic and overseas markets	15	15
3.	**FLEXIBLE PACKAGING** • Characteristics of Flexible Packaging • Types of Interactions in packaging: Permeation, Migration,Sorption • Pouch Styles- Pillow Pouches, Four-side Seal pouches, Stand up pouches • Forming Pouches, Retort Pouches, Bulk and Heavy-Duty Bags, Bag-in-box - Control of Packaging Atmosphere • Vacuum-packaging • Modified Atmosphere Packaging(MAP) • Controlled Atmosphere Packaging(CAP) • Active Packaging Technology -Aseptic Packaging -Blister Package and Pouch package -Retort Package -Cushion Packaging: Need of Cushion Package, methods of isolation of shock, Fragility of Products, Cushion Materials -Package Wrapping Techniques:- Shrink Film Wrapping, properties of Heat Shrinkable films, Stretch Wrapping, Skin packaging - Tetra packs for Dairy Industry - Agriculture produce markets : Nets, films, etc. -FMCG Industry	15	20
4.	• **RIGID PACKAGING** • Bottles for Pharma, Pesticide, Chemical Industry, Dairy industry, etc. • Caps designs like CRC caps, spouts,etc	15	15
5	**Machinery used for Packaging**	15	**10**

	• Form/Fill/Seal machines • Flow Wrap machines • bottle filling lines with automation like labelling, auto capping, coding[ink jet], collating and shrink wrapping • Induction and heat sealing • Export and Sea worthy Packaging		
6	**Testing of Plastics Packages:** -Types of tests:-Drop testing, Vibration Testing, Impact Testing, Compresssion Testing -Migration Test:- Water Vapour Transmission Rate, Gas transmission rate - Testing of plastic films:- Optical properties, Mechanical Tests - Online testing of Packages - Testing for both flexible and Rigid packages [Industry wise]	30	**25**
		58	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
15	15	20	10	5	5

WhereR:Remember;U:Understanding;A:Application,N:AnalyzeandE:EvaluateC:Create(asper Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

Books:

1. **Handbook of Packaging Engineering, J.F.Honlo, 3rd edition, CRC Press**
2. **Plastics Packaging Properties, Processing, Applications and Regulations 2nd Edition by Susan Selke, John D Culter, Ruben J. Hernandez, Hanser Publications**
3. **Fundamentals of Packaging Technology by S. Natarajan, M. Govindrajan, B. Kumar 2nd edition, PHI learning Pvt Ltd. Delhi**
4. **Packaging with plastics by Bruins Paul F , Gordon and Breach Science Publishers (1974)**
5. **Advances in plastics packaging technology by John Briston**

)Open source software and website:

1) https://nptel.ac.in/

2) https://www.bpf.co.uk/

Suggested Course Practical List: : As per the above syllabus topics

List of Laboratory/Learning Resources Required:

Suggested Project List:

Suggested Activities for Students :

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